claims

1. A method for detecting a target nucleic acid molecule, said method comprises:

a) preparing a cell lysate comprising lysing a cell in a biological sample in a lysis buffer to release the target nucleic acid molecule from the cell;

b) incubating the cell lysate from step a), without nucleic acid purification, with a nucleic acid probe immobilized on a solid substrate under conditions that allow hybridization between the target nucleic acid molecule and the probe, wherein the nucleic acid probe comprises a sequence complementary to the target nucleic acid molecule;

c) assessing hybridization between the target nucleic acid molecule and the probe to determine the presence, absence and/or amount of the target nucleic acid molecule.

2. The method of claim 1, wherein the cell is lysed in the lysis buffer by a physical method.

3. The method of claim 2, wherein the physical method is selected from the group consisting of grinding, ultrasonic lysing, lysing with high temperature, and freezing.

4. The method of claim 1, wherein the cell is lysed in the lysis buffer by a chemical method.

5. The method of claim 4, wherein the chemical method is lysing with a protein denaturant or a detergent.

6. The method of claim 1, wherein the cell is lysed in the lysis buffer by a biological method.

7. The method of claim 6, wherein the biological method is lysing with a proteinase or a lysozyme.

8. The method of claim 1, wherein the cell is lysed by any combination of a physical, a chemical, and a biological method.

9. The method of claim 1, wherein the cell lysate is incubated with the probe immobilized on the substrate in the lysis buffer for hybridization.

10. The method of claim 1, wherein an agent that aids for hybridization is added to the cell lysate before the cell lysate is incubated with the probe.

11. The method of claim 10, wherein the agent is selected from the group consisting of NaCl, citrate sodium, and SDS.

12. The method of claim 1, wherein the biological sample is a sample selected from the group consisting of a non-virus biological organism, a biological tissue, a eukaryotic cell, and a prokaryotic cell.

13. The method of claim 1, wherein the target nucleic acid molecule is selected from the group consisting of a genomic DNA, a plasmid, a mitochondria DNA, a chloroplast DNA, a messenger RNA, a ribosomal RNA, and a small nuclear RNA.

14. The method of claim 1, wherein the solid substrate comprises a material selected from the group consisting of a nylon film, a pyroxylin film, a silicon, a glass, a ceramic, a metal, a plastic, and a combination thereof.

15. The method of claim 1, wherein the solid substrate comprises a plurality of nucleic acid probes, and wherein the plurality of the nucleic acid probes are immobilized on the solid substrate to form an array.

16. The method of claim 15, wherein the plurality of the nucleic acid probes have different nucleotide sequences.

17. The method of claim 16, wherein the number of different probes is from about 2 to about 100,000.

18. The method of claim 15, wherein the area of the array is from about 0.01 mm^2 to about 100 cm^2.

19. The method of claim 15, wherein the array is selected from the group consisting of a two-dimensional array, a three-dimensional array, and a four-dimensional array.

20. The method of claim 1, wherein the nucleic acid probe immobilized on the solid substrate comprises a single-stranded oligonucleotide or a double-stranded PCR product.

21. The method of claim 1, wherein the cell lysate comprises an agent selected from the group consisting of a detergent, a protein denaturant, a buffer, a nuclease inhibitor, a salt, and a combination thereof.

22. The method of claim 1, wherein the hybridization between the target nucleic acid molecule and the nucleic acid probe is assessed by determining binding of a reporter to the target nucleic acid molecule, wherein the reporter comprises a detectable marker selected from the group consisting of a fluorescein, an isotope, a biotin, a digoxin, a gold colloid, a magnetic bead, a electrochemical label, and a chemiluminescent label.